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THE MANUFACTURE OF HARD FIBER COMBS

By C. C. KELLAR, '29



COMB is probably one of the most commonplace things in life, and yet, we really know very little of its composition. I shall attempt to describe the process of making the material for combs and also the manufacture of the combs themselves.

There are two distinct types of combs as to material. They are aluminum and hard fiber. These are divided up into over sixty sizes and styles. When you stop to think of all the kinds, such as "Bobby combs," "barber combs," "pocket combs," and a host of others, you can readily see that such a large number is possible. The big thing in the manufacture of the combs is the material from which the comb is made. It must be both durable and flexible. Of the two types it seems to be a matter of personal taste as to which kind to use, as there are about as many aluminum combs sold as fiber ones. The manufacture of fiber combs is much more involved than of the aluminum ones, however. Since the manufacture of fiber is quite a project I shall describe its manufacture before telling of the production of combs.

The fiber is made from nothing but cotton or linen stock. It can be made from wood pulp or jute but the product is of inferior grade and cannot be used for combs. When the stock is received into the fiber plant it is thoroughly dusted and sorted to remove all objectionable pieces. It is then cut into small pieces, boiled with soda and thoroughly washed in large washing machines. This material is now bleached until snow white and then beaten into a pulp, after which it is colored and run off on a paper machine into the desired form for using on the fiber machines. The standard colors are red, gray, black, russet, brown, granite and white. Mottled colors are made also and are used for certain styles of combs. The paper is then taken to the fiber mill and rolled into sheets of the desired thickness while being treated with a mixture of chemicals that thoroughly unite the layers and form a homogeneous and jelly-like mass of any desired thickness. The material while in this condition must be handled very carefully until it has hardened, as any blemish which appears on the sheets now will mar the finished product.

The next process is to put these sheets into large tanks of chemicals. These chemicals consist mainly of chloride of zinc and the changes that take place are not clearly understood by any one. The successful carrying out of the operation depends upon the skill and experience of the experts in charge of the work. The time that a sheet must stay in its chemical bath varies with the thickness of the sheet. A sheet one inch thick has to be treated by this process for eight months. This is a critical period in the manufacture of fiber, and unless extreme caution is taken the material is apt to spoil and be a total loss. When the sheets have been removed from the tanks, they are put in dry houses. These dry houses

are places where the sheets are dried by means of air. They are then subjected to heavy pressure in hydraulic presses. The next process is to finish the sheets in calender rolls to bring them to the desired thickness and to give the surface a smooth finish. The product is now called "hard fiber" and has a multitude of uses of which the manufacture of combs is probably the most important. It is called hard fiber because of its very hardness, as it is almost as hard as cast iron. This is probably the biggest reason for having the word "Indestructible" stamped on so many combs. It is not to the credit of the manufacture of the combs, but to the fiber maker involved, that the combs will give good service and long life. This point alone shows how important it is to have good material in the manufacture of combs.

We will now begin with the fiber as it comes to the comb factory. When it is first received, it is still very hard and brittle and it would be impossible to do anything with it unless it could be softened. This hard fiber has the property of absorbing water and thus becoming pliable and then hardening upon drying. This property of the fiber is made use of and it is soaked in water for two or three days. The time that it is soaked depends upon the thickness, the thicker sheets being soaked about three days. The sheets of fiber are now cut into strips a little wider than the width of the comb. The reason for this will be shown by the next operation.

The strips are then cut into lengths the exact size of the comb to be made. This is done on a punch-press that is operated by hand. The next operation is cutting the teeth. Two combs are made from one strip. The strip lays on a carriage that moves horizontally and is driven by a ratchet. A blade that is mounted to move vertically makes a cut every time the carriage is advanced one notch on the ratchet. The number of teeth to the inch is varied by the ratchet. The more notches on the ratchet, the closer the teeth will be together, the knife being timed with the ratchet. We can now see why the strip must be wider than the comb, since the material for the back of the comb must be added to the width of the strip so that the two combs can be cut at once. The ends of the strip are now trimmed off so that the combs will come apart and the ends sloped down to the thickness of a tooth. This is all done while the fiber is wet and workable.

Drying is the next operation. The strips are now taken to the dry house where they are thoroughly dried in air which is kept as close to atmospheric conditions as possible. They are left there for about a week or ten days. The fiber is now as hard as it was before it was soaked and has the same properties. The combs are now pulled apart and each comb is rough looking just like a piece of fiber with notches sawed in it.

(Continued on Page 31)

FIBER COMBS

(Continued from Page 8)

It now goes through a series of finishing operations which make it a finished product.

From now on each comb is handled separately. The first step in finishing is sanding. This is done in a sanding machine which consists of four sets of rollers wrapped with different grades of sandpaper. The comb is held for a moment between two rollers and then moved on to the next set, the sequence being from coarse to fine. This process removes all the superfluous fiber, and makes the combs fairly smooth.

The teeth are still the same width as the thickness of the comb, so it becomes necessary to point them. This operation is called pointing. This is done on a machine that resembles a grindstone except that the power is furnished by electricity and not by the human arm. The cut starts about one-half inch from the end of the tooth and slopes down to a point. Of course, this distance varies with the size of the comb. The smaller ones have not more than one-eighth inch to the point. In this operation the comb is held against the grindstone and moved back and forth at the proper angle. An experienced workman can perform the operation very quickly and get almost the same slope on all the points.

Buffing is the next operation. Carpet buffers are used and make a crude-looking device, but they seem to get the desired polish. This buffer is a wheel of circular strips of carpet, the comb being held by hand against the wheel. The operation is very short, as it takes but a few seconds to buff each comb. The trade mark of the firm is then stamped on the back and the mark bronzed. Not all combs are bronzed as the cheaper kinds do not warrant the process.

Polishing is the next and last step. The combs are polished on buffers of muslin and cotton flannel. There is no liquid or paste used, simply the buffers which revolve at a speed of two hundred revolutions per minute. They are first polished on the muslin buffer and immediately afterwards on the cotton flannel buffer, one person performing both operations. Each comb is inspected separately and only first grade combs are sent to the market, the inferior ones being discarded.

However, there are very few combs spoiled in the manufacture.
